Backup Exec 12.5 Agent for VMware Virtual Infrastructure FAQ

Contents

Overview

1. What is the Backup Exec 12.5 Agent for VMware *Virtual Infrastructure*?

Answer-
The new Agent for VMware Virtual Infrastructure is being introduced with Backup Exec 12.5 to protect a VMware Virtual Infrastructure. The VMware Virtual Infrastructure product family includes VMware ESX, VirtualCenter, Virtual Consolidated Backup (VCB), VMware Converter, VMotion, etc and is officially branded as **VMware Virtual Infrastructure 3 (VI3)** by VMware. Backup Exec 12.5's Agent for VMware Virtual Infrastructure (AVVI) can leverage all of these components of VMware VI3 to automatically discover, protect, and recover virtual machines and their data.

2. Can Backup Exec 12.5's Agent for VMware Virtual Infrastructure (AVVI) backup Guest virtual machines while they are online and running?
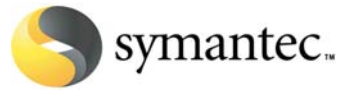
Answer-
Yes, all Guest virtual machines (VM's,) including Windows and Linux virtual machines, can be protected while they are online and running. This can be done without any downtime of a running virtual machine using Backup Exec's Agent for VMware Virtual Infrastructure's (AVVI) integrated support of VMware's Virtual Consolidated Backup (VCB) technology.

This allows both physical and virtual systems to finally be protected from a single backup and recovery solution, Backup Exec for Windows Servers 12.5.

3. Can offline Guest virtual machines also be protected?

Answer-

Yes, both offline and online Guest virtual machines can be protected together in a single backup.

4. Can I protect applications like Microsoft Exchange, SQL and SharePoint running inside of Guest virtual machines?

Answer-
Yes, there are multiple methods that can be used to protect applications inside of Guest virtual machines depending on the recovery needs. Please see the **Database and Application Protection** section of this document for complete details on how to protect applications inside of Guest virtual machines.

5. What is VMware "VCB"?

Answer-
VMware's Virtual Consolidated Backup or "VCB" is a backup framework technology, developed by VMware in conjunction with its partners, which allows backup applications to take online snapshots of running Linux and Windows Guest virtual machines hosted on VMware ESX or ESXi servers. VCB then allows those snapshots to be moved to a separate system known as a "VCB Proxy Server" to be backed up "off-host" from the ESX host server by a backup application, such as Backup Exec 12.5, without impacting the ESX host server and all of its Guest virtual machines during a backup.

6. Does Backup Exec 12.5 Agent for VMware Virtual Infrastructure (AVVI) support VMware ESX 3 Virtual Consolidated Backup (VCB) technology?

Answer-
Yes, Backup Exec 12.5 AVVI leverages key VMware technology, such as VCB and VirtualCenter, to perform backups of virtual machines *without* the need to create or manage any complex VCB backup scripts, configuration text files, or integration modules. VCB support is integrated within Backup Exec 12.5 AVVI.

**7. How do I obtain VCB from VMware and how much does it cost?**

Answer-
VCB is actually free and is included in all versions of ESX 3, including Foundation, Standard, and Enterprise editions, as well as ESXi. The VCB framework package can then be installed directly on a Windows server to enable it as a "VCB Proxy Server". For more information on VCB licensing, please visit
http://www.vmware.com/products/vi/cb_buy.html

8. Do I have to install any agent on my ESX server?

Answer-
No, with Backup Exec 12.5 AVVI there is nothing to install on the ESX server or in the ESX service console. AVVI can be activated with a single license key on the Backup Exec 12.5 server and managed from the Backup Exec 12.5 console. All necessary communication occurs through VMware VirtualCenter or directly to the ESX server without installing any Backup Exec Agent directly on it.
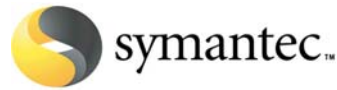
9. **If there is no Agent on the ESX server, how does Backup Exec 12.5's AVVI discover ESX servers and Guest virtual machines?**

Answer-
Backup Exec 12.5 AVVI is built to leverage the VMware VirtualCenter infrastructure if present in an environment. All ESX host servers and their Guest virtual machines that an installation of VirtualCenter is aware of can be automatically discovered by Backup Exec. This makes setting up and configuring backups of large numbers of Guest virtual machines easy regardless of which ESX server is currently hosting them. If VMware VirtualCenter is not installed in an environment, simply provide the IP addresses' of the ESX servers to Backup Exec to discover the ESX servers and their Guest virtual machines.

10. **Do I have to restore my entire Guest virtual machine to recover just an individual file or folder?**

Answer-
No, Backup Exec 12.5 AVVI allows for the recovery of individual files and folders from a complete *single-pass* backup of a Windows Guest virtual machine using Backup Exec's Granular Recovery Technology (GRT). This means that a single backup can be done of a Windows Guest virtual machine that allows two different ways to restore it at either the individual file/folder level or complete virtual machine. Linux Guest virtual machines must be recovered in their entirety at the .vmdk level.

11. **What are the other main features of Backup Exec 12.5 AVVI?**

Answer-
Backup Exec 12.5 Agent for VMware for Virtual Infrastructure includes a number of features designed to solve the major problems affecting virtual machine backup and recovery today including;

- Physical and virtual system protection from a single application
- Integrated support of VMware's VCB technology
- Granular recovery of individual files from within a Windows Guest virtual machine
- Automatic discovery of VMware Virtual Infrastructure's via VMware VirtualCenter
- Space optimized backups of Guest virtual machines .vmdk files
- Support for all major network and storage configurations of VMware ESX server
- Automatically registering a Guest virtual machine with VirtualCenter after a restore
- Retargeting of a Guest virtual machine to an alternate datastore, host, and network

Supported Configurations

1. **What versions of ESX and ESXi are supported with Backup Exec 12.5 AVVI?**

Answer-
Backup Exec 12.5 AVVI supports most current versions of ESX 3, including 3.0.2 through ESX 3.5 Update 2 including ESXi 3.5. Please see the official Backup Exec 12.5 Software Compatibility List for the latest detailed information on specific versions supported and limitations, please see the Backup Exec 12.5 Software Compatibility List
http://seer.support.veritas.com/docs/307063.htm
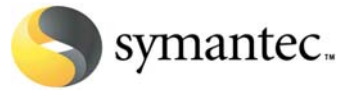
2. What Guest virtual machine OS's are supported for backup?

Answer-
Any Guest OS supported by VMware on ESX is also supported by Backup Exec 12.5 Agent for VMware Virtual Infrastructure. For the latest detailed information on specific versions supported and limitations, please see the Backup Exec 12.5 Software Compatibility List
http://seer.support.veritas.com/docs/307063.htm

3. What versions of VMware VCB does Backup Exec 12.5 AVVI support?

Answer-
Backup Exec 12.5 AVVI currently supports the latest versions of VMware VCB from 1.1 through 1.5.

4. Does Backup Exec 12.5 AVVI also support the free VMware Server (formerly known as GSX Server)?

Answer-
No, Backup Exec 12.5's AVVI is designed and built to communicate directly with VMware ESX and VirtualCenter and does not support VMware Server 1.0 or 2.0.

However, Backup Exec, as well as all agents and options, can be installed inside of Guest virtual machines running on VMware Server to protect the virtual machine if the Guest operating system is supported with those Agents and Options.

Please see the official Backup Exec 12.5 Software Compatibility List for detailed information on specific versions and limitations.
http://seer.support.veritas.com/docs/307063.htm

5. What types of ESX storage and network types can AVVI support?

Answer-
Almost all ESX/ESXi storage types and network transports are supported with AVVI including;
- Fibre Channel SAN's
- iSCSI SAN's
- ESX Direct-Attached Storage (DAS)
- Network File System (NFS)

6. Are both tape and disk-based backup devices are supported?

Answer-
Yes, both tape and disk devices are supported with Backup Exec 12.5 AVVI. Disk-based backups work best and are generally recommended to be done as part of a disk-to-disk-to-tape (D2D2T) backup strategy. Please ensure the tape device is a supported device on the Backup Exec 12.5 Hardware Compatibility List at
http://seer.support.veritas.com/docs/306831.htm

7. Are Guest virtual machines with "RDM" disks supported?
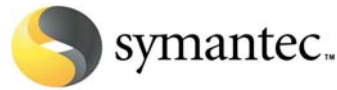
Answer-
There are two types of RDM disks. RDM disks can be placed into Physical or Virtual compatibility Mode. Physical compatibility mode (i.e. persistent-independent) bypasses the ESX storage infrastructure (vmfs file system) and thus cannot have a snapshot taken by VCB. Physical compatibility mode RDM disks in this configuration are skipped automatically during the backup. Virtual compatibility mode RDM disks are not skipped and are included in the backup automatically and will include ALL data located on the mapped LUN.

For Physical compatibility mode RDM disks, Backup Exec Remote Agents can be installed in the Guest virtual machine to backup their data using traditional backup methods.

8. How should my VCB "Proxy Server" be configured?

Answer-
A VCB Proxy Server's purpose is to temporarily store the VCB snapshots created during the backup of the Guest virtual machines so that it is the temporary snapshots can then be backed up by a 3rd party backup application. VCB Proxy Servers can be created on any Windows 2003 server that has connectivity to the VMware infrastructure by installing the VCB framework software from VMware on them. There can even be multiple VCB Proxy servers in larger VMware environments. In general, the following recommendations apply:

- For performance reasons, it is recommended that the Backup Exec server and the VCB Proxy Server be installed on the same system so that the VCB snapshots being backed up are done locally instead of across the network.
- The VCB Proxy Server disk sub-system should be built around multiple-spindle, low-cost, fast disks. All disk subsystem types supported by Windows are supported for use on the VCB Proxy Server.
- Multiple physical disks in a RAID 0 configuration would be recommended. Reliability, such as RAID 5 systems, should not be a primary concern since the VCB Proxy Server will only contain temporary snapshot copies of production data.
- For specific VCB Proxy Server sizing recommendations please see the **Backup** section of this document below.

9. Can Backup Exec 12.5 Media Servers be installed on a Guest virtual machine running on an ESX server?

Answer-
Yes, Backup Exec 12.5 media servers can be installed in a supported guest virtual machine OS running on an ESX server to protect the entire server. However, the benefits of performing an "off-host" snapshot backup away from the ESX server will not be realized if the Backup Exec server is virtualized and backup I/O is impacting the performance of the ESX server. In this configuration it is recommended that the "Hot Add" backup transport method be selected in the Backup Job Properties|VMware Virtual Infrastructure settings screen in Backup Exec 12.5.

It should also be noted that VMware ESX support of local tape devices is limited to only certain SCSI hardware configurations. The directions for connecting the SCSI backup
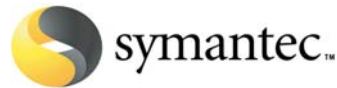
device to a virtual machine through the SCSI pass-through mechanism are detailed in the *ESX Server Administration Guide* and include the following restrictions:

- VMware supports attaching SCSI drives to the ESX Server using Adaptec SCSI adapters. Using other adapters, such as LSI MPT‑Fusion SCSI, is not supported.
- If using a tape drive library (versus using a stand‑alone tape drive), the library must be multi‑target, and not multi‑LUN.
- Set the tape drive's virtual target ID in the virtual machines configuration to be the same as the physical target ID.
- Fibre Channel attached tape devices are not supported by VMware
- Ensure the tape device is a supported device on the Backup Exec Hardware Compatibility List at http://seer.support.veritas.com/docs/306831.htm

For these reasons, it is recommended that backup-to-disk (B2D) devices be used for backup targets for Backup Exec 12.5 servers running inside of guest virtual machines on ESX.

Backup

1. **What methods of backup are currently supported with Backup Exec 12.5's AVVI?**

Answer-
VMware VCB provides several different backup methods that AVVI can take advantage of depending on your storage and networking configuration. Backup Exec 12.5 AVVI supports all of these current methods including:

- FibreChannel SAN-based "off-host" snapshot backups
- iSCSI SAN-based "off-host" snapshot backups
- NBD/NBDSSL network-based snapshot backups
- Local backups via ESX 3.5 "hot-add" snapshot backups

Off-host backups avoid performance impacts on the ESX server during backup.

2. **How are Guest virtual machines protected?**

Answer-
AVVI provides Full backups of Guest virtual machines through VMware's VCB backup framework. All backups are performed at a complete image-level of the Guest virtual machine and can be done using the backup methods described above to a Windows "VCB Proxy" server. All necessary files of the Guest virtual machine are automatically protected via VCB including:

- .vmdk files
- .vmx files
- .log files
- .nvram files

3. **Can I perform Incremental or Differential backups of Guest virtual machines?**
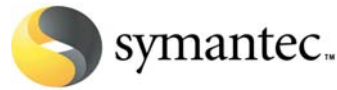
Answer-
VMware VCB technology does not currently provide any means to perform Incremental or Differential backups of Guest virtual machines. Currently, Incremental or Differential backups of Guest virtual machines can only be performed using traditional file-level backup methods of using a Backup Exec Remote Agent for Windows Systems or Remote Agent for Linux/Unix Servers inside of the Guest virtual machine.

4. **How are Backup Exec Remote Agents for Windows Systems or Remote Agent for Linux/Unix Servers licensed with AVVI for Incremental or Differential file-level backups inside a Guest virtual machine?**

Answer-
Please see the **Licensing** section of this document for complete details.

5. **Does Backup Exec 12.5 also support VMware VirtualCenter VMOTION during a backup?**

Answer-
Yes, Backup Exec 12.5 AVVI backups are unaffected by the VMOTION or DRS process and can continue to automatically protect Guest virtual machines if they move to another ESX host. The backup will complete normally during a VMotion event.

6. **Are the .vmdk files space optimized or compressed during a backup?**

Answer-
Yes, .vmdk files are automatically optimized and compacted during backup to ensure space savings. For example, if a 50GB .vmdk that contains only 20GB of actual data is being backed up, only the 20GB of actual data will be sent to the backup location by Backup Exec. If the backup target device supports compression, Backup Exec can further compress the data being protected to provide additional space savings of a Guest virtual machine backup.

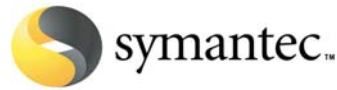7. **Does the Continuous Protection Agent (CPA) support ESX environments?**

Answer-
Yes, the Backup Exec 12.5 Continuous Protection Agent is tested and supported running in Windows Guest virtual machines as part of the Backup Exec Agent for Windows Systems (AWS). The CPA can be installed on the Windows guest virtual machines, assuming the guest OS is supported. Continuous Protection is not supported for running directly on Linux or ESX servers. Please see the Backup Exec 12.5 Continuous Protection Software Compatibility List for details and any limitations
http://seer.support.veritas.com/docs/307063.htm

8. **Can the Backup Exec 12.5 Remote Agent for Linux and UNIX (RALUS) be used within the ESX service console to backup Guest virtual machines?**

Answer-
For **ESX 3.x**, the Backup Exec Remote Agent for Linux\UNIX (RALUS) can be installed on ESX 3.0.2 and higher to perform on-host, **non-VCB** backups, inside the ESX service console

of the ESX server's configuration files. ESXi cannot be supported via RALUS due to its lack of the service console.

With the introduction of Backup Exec 12.5's Agent for VMware Virtual Infrastructure, it is no longer recommended to use the Backup Exec RALUS Agent to protect online Guest virtual server(s) on the ESX servers since they must be shut down manually to ensure backup consistency and avoid backup failure or additional scripting must be done as pre\post process as part of the backup job to snapshot the running guest virtual servers.

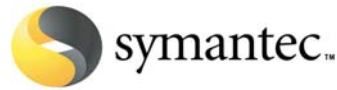## 9. What type of backup performance should I expect?

Answer-
The VCB backup process offloads backup processing from the ESX Server to the VCB Backup Proxy Server. Backup performance will be largely determined by the slowest component of the entire backup data path from the ESX Server, to the VCB Proxy Server, to the Backup Exec storage location (i.e Tape or Disk). These components are**:**

- VCB Proxy Server system resources: CPU (Ghz)
- Recommended size of the staging area on the VCB Proxy Server
- System I/O Performance (Gbps)
- Network type (FibreChannel, iSCSI, Ethernet, etc)

Here are some basic guidelines that should be followed when designing the VCB Backup Proxy Server:

- Strongly consider making your Backup Exec Server your VCB Proxy Server on the same system to avoid the additional time required to move the backup data from the VCB Proxy Server to a remote Backup Exec Server across a network.
- CPU, I/O, and memory expandability should be a consideration when choosing a server to be a VCB Proxy Server to account for future Guest virtual machine growth.
- Size the CPU to support 10 MHz of CPU available per 1 MB/second of data throughput in *and* out of the VCB Backup Proxy Server.
- The internal bus of the Backup Proxy should be fast enough to support the I/O devices connected to it. If multiple I/O ports are used, a system with multiple internal buses should be considered to support the additional I/O.
- Backup Proxy Server I/O performance is generally more important than CPU performance. For example, a 2 Gb Fibre connection should be able to transfer either VCB snapshot or backup data at a nominal transfer rate of 140 MB/second. Backups over iSCSI or Gigabit Ethernet will likely be much slower, while 4 Gb FibreChannel connections should be significantly faster.
- The VCB Proxy Server disk space for the snapshot mount point (staging area for VCB snapshots) should be sized using the following equation:
  VCB Proxy Server Mount Point Disk Size (GB) = (NUM_VM) x (AVG_SIZE)
  Where: NUM_VM = Largest number of Guest virtual machines to backed up simultaneously and AVG_SIZE = Average size of the largest Guest virtual machines to be backed up simultaneously.
  For example, if five Guest virtual machines are to be backed up simultaneously, take the five largest VMs in the environment, calculate their average size, and use that number as (AVG_SIZE) in this equation.

Database and Application Protection

1. Do I still need to use separate Backup Exec Database or Application Agents for backups?

Answer-
Yes, it is extremely important that Backup Exec Database or Application Agents continue to be installed inside of Guest virtual machines and separate regular database or application level backups be performed of virtualized applications such as Microsoft SQL, Exchange, SharePoint, Oracle, Active Directory, Lotus Domino, etc. These applications and databases require regular log truncation, database maintenance, consistency checks, etc that are performed only as part of a regular Backup Exec database or application Agent-level backup. If these separate Database Agent-level backups are not performed regularly, application log files could continue to accumulate, eventually fill the entire disk, and cause application or database failure.

Additionally, Backup Exec 12.5 database and application Agent backups allow granular recovery and point-in-time recovery of the application itself. For example, to recover an individual Microsoft Exchange mailbox, message, contact, calendar item, or database, the backup must have been performed separately with the Backup Exec Agent for Microsoft Exchange.

2. How do I protect and recover entire Guest virtual machines that run applications or databases like Microsoft SQL, Exchange, SharePoint, etc?

Answer-
Applications that utilize the Microsoft Volume Shadow Copy Service (VSS) framework on Windows 2003 and 2008 can be protected as part of an image-level backup ***of the entire Guest virtual machine*** with AVVI using a "VSS Requestor/Provider" that must be installed inside of the Guest virtual machine running the application.

There are two options for obtaining a VSS "Requestor/Provider" for your Windows Guest virtual machines running Windows 2003 or later:

- A generic version can be obtained as part of ESX 3.5 Update 2 from VMware
- A BackupExec specific version can be obtained as part of Backup Exec 12.5 AVVI on the Backup Exec 12.5 CD. Please see your Backup Exec 12.5 Administrator's Guide for more details on how to install the VSS "Requestor/Provider"
- Each VSS Requestor/Provider should be installed separately and never on the same system at the same time. Please select one or the other.

If your application is not "VSS aware", this information does not apply. Check with your application or database vendor to confirm its VSS capabilities.

3. How are applications that are _not_ VSS-compliant protected?

Answer-
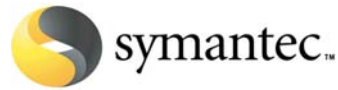
Applications installed in Windows or Linux Guest virtual machines that are not VSS-compliant such as Lotus Domino, Oracle, SAP, DB2, etc cannot be properly quieisced using the VMware or Backup Exec VSS Requestor/Provider. It is recommended that Backup Exec Database or Application Agents be used inside of the Guest virtual machine to protect these applications.

Alternatively, Backup Exec pre-post job scripts can be created and used in conjunction with VMware's VCB scripting to shut down these applications prior to backup.

4. How are Backup Exec 12.5 Database and Application Agents licensed in Guest virtual machines?

Answer-
Existing Backup Exec Database and Application Agent licensing for physical systems also applies to virtual environments. Please see the **Licensing** section of this document for specific information and examples.

5. Can other Backup Exec 12.5 Agents and Options be installed on a Guest virtual machine running on an ESX 3.x server?

Answer-
Yes, all Backup Exec remote Agents and Options can be installed on the Guest virtual server, assuming the guest OS is supported. Please see the **Licensing** section of this document for specific information and examples.

Virtual Machine Recovery

1. Do I have to recover the entire virtual machine?

Answer-
No, while backups of Guest virtual machines are done at full image-level of the entire Guest virtual machine, restores can be done at multiple levels including:

- The entire Guest virtual machine including .vmdk files, .vmx files, .log files, etc
- Individual files and folders *within* a .vmdk file (Windows only)

**2. How are individual files restored from within a .vmdk file?**

Answer-
Backup Exec's Granular Recovery Technology (GRT) allows the Agent for VMware Virtual Infrastructure to catalog and open .vmdk files directly for restore purposes from within the Backup Exec console. No separate utilities or consoles are required to do this.

3. How can I use GRT to recover individual files and folders directly to Guest virtual machines?

Answer-
There are two possible methods for recovering individual files/folders directly to a Guest virtual machine with Backup Exec's GRT technology.
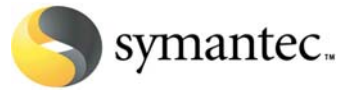
- Install a Backup Exec Agent for Windows Systems (AWS) into the Guest virtual machine and perform the restore like any other Backup Exec restore operation
- If there is no desire to install a Backup Exec AWS into the Guest virtual machine just for restore purposes, files/folders can be redirected to be restored to the local Backup Exec server and copied manually to the Guest virtual machine using Windows Explorer

4. Does Backup Exec GRT work from tape and disk-based backups?

Answer-
Yes, both tape and disk-based backups are supported for GRT-enabled recoveries of Windows Guest virtual machines. Tape-based backups will require the specific .vmdk file will be automatically staged back to a temporary disk location by Backup Exec to recover the individual files/folders from within it and then deleted after the restore completes.

5. How are entire Guest virtual machines recovered?

Answer-
VMware has provided a VCB restore interface via VMware Converter 3.02 (or later) for backup applications to recover Guest virtual machines to use. Restores of Guest virtual machines can be initiated from within the Backup Exec 12.5 console's Restore view along with your traditional physical system backups. With AVVI's restore flexibility, Guest virtual machines can be restored to several different locations including:

- Original locations on the ESX host using VMware Converter
- Alternate VMware ESX host and datastore using VMware Converter
- To any directory location (e.g. f:\temp) as standalone files without using VMware Converter

### 6. What type of restore performance can I expect?

Answer-
Expect entire Guest virtual machine recoveries to take longer than a backup. VMware VCB technology does not currently support Guest virtual machine restore over a SAN, even if the Guest virtual machine was backed up over a SAN. Additionally, the restore process of an entire Guest virtual machine to its original location must also be processed via VMware Converter which can add additional time to the restore operation.

Licensing

1. How is Backup Exec 12.5 AVVI licensed?

Answer-
Backup Exec 12.5 AVVI is licensed simply on a **per ESX server** basis. There is **no** "**per CPU**" **or "per Guest virtual machine" licenses required**. Simply count the number of ESX servers in the environment hosting Guest virtual machines that need to be protected.
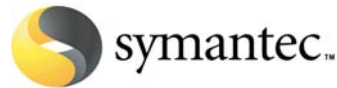
For example, three (3) ESX servers hosting ten (10) Guest virtual machines each to be protected would require:

- One (1) Backup Exec 12.5 Media Server license
- Three (3) Backup Exec 12.5 Agent for VMware Virtual Infrastructure licenses

2. How Are Backup Exec Remote Agents for Windows Systems and Linux/Unix Systems licensed with AVVI If Used?

Answer-
Each Backup Exec 12.5 AVVI license includes the licensed right to deploy an unlimited number of Backup Exec Agent for Windows Systems (AWS) and Backup Exec Agent for Linux/Unix Servers (RALUS) to Guest virtual machines on a protected and licensed ESX host with AVVI. For example, if there are 10 Windows Guest virtual machines and 10 Linux Guest machines on an ESX server licensed with AVVI, Backup Exec Agent for Windows Systems and Agent for Remote Linux and UNIX Servers can be installed in each Guest virtual machine for whatever purpose needed (i.e. Direct-to-Guest file/folder restores, file-level Incremental/Differential backups, etc.

3. How are Backup Exec 12.5 Database and Application Agents licensed in Guest virtual machines?

Answer-
Existing Backup Exec Database and Application Agent licensing for physical systems also applies to virtual environments. Each Guest virtual machine running an application to be protected will require a separate Backup Exec Database or Application Agent licensed and installed in it.

For example, three (3) Guest virtual machines each running Windows 2003 and Microsoft SQL 2005 to be protected would require:

- One (1) Backup Exec 12.5 Media Server license
- Three (3) Backup Exec 12.5 Agent for Microsoft SQL Server licenses

Future Enhancements

1. Will there be any future enhancements for Backup Exec regarding the Agent for VMware Virtual Infrastructure?

Answer-
Yes, absolutely. If you have suggestions on what features and functionality you would like to see for future versions, please feel free to submit your requests for Backup Exec at http://enhancement.symantec.com

Also, for Physical to Virtual (P2V) and Virtual to Physical (including dissimilar hardware) system recovery and migration capabilities be sure to review the upcoming Backup Exec System Recovery 8.5 release at www.backupexec.com/besr

2. Where can I find additional information on VMware backup and recovery best practices?
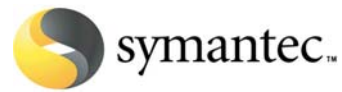
Answer-
These resources will assist you in becoming more familiar with ESX backup and recovery concepts and planning

- The **"VMware Virtual Machine Backup Planning for ESX "** guide
  http://www.vmware.com/pdf/ESXBackup.pdf

- The **"Backup Software Compatibility for ESX Server 3.x"** guide
  www.vmware.com/pdf/vi3_backup_guide.pdf

- The **"Consolidated Backup in VMware Infrastructure 3"** whitepaper
  www.vmware.com/pdf/vi3_consolidated_backup.pdf